

GEM-CEDAR STUDY OF IONOSPHERIC ENERGY INPUT AND JOULE DISSIPATION

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We are studying ionospheric model performance for six events selected for the GEM-CEDAR modeling challenge. DMSP measurements of electric and magnetic fields are converted into Poynting Flux values that estimate the energy input into the ionosphere. Models generate rates of ionospheric Joule dissipation that are compared to the energy influx. Models include the ionosphere models CTIPe and Weimer and the ionospheric electrodynamic outputs of global magnetosphere models SWMF, LFM, and OpenGGCM.

This study evaluates the model performance in terms of overall balance between energy influx and dissipation and tests the assumption that Joule dissipation occurs locally where electromagnetic energy flux enters the ionosphere. We present results in terms of skill scores now commonly used in metrics and validation studies and we can measure the agreement in terms of temporal and spatial distribution of dissipation (i.e, location of auroral activity) along passes of the DMSP satellite with the passes' proximity to the magnetic pole and solar wind activity level.